PROJECT facts
U.S. Department of Energy
National Energy Research Laboratory

Materials and Advanced Metallurgical Research
11/2001

Advanced Hydrogen Transport Membranes for Vision 21 Fossil Fuel Plants

Project Lead
Eltron Research, Inc.
Boulder, CO

Description

Duration: 9/21/00 - 9/30/03

The objective of this project is to develop an environmentally responsible, cost-effective, and efficient method for separating hydrogen from gas mixtures produced during industrial processes, such as coal gasification. This objective will be accomplished by employing dense ceramic membranes based in part on Eltron-patented materials with a demonstrated ability for rapid proton and electronic conduction. The primary technical challenges in achieving the goals of this project are to optimize the composition and microstructure of ceramic materials for conductivity and stability, and to develop thin film ceramic structures that enable hydrogen separation rates in excess of 10 ml/min/cm^2. Other key aspects of this technology R&D program include catalysis, ceramic processing methods, and the design of a separation unit operating under high pressure. Multiphase materials with maximum ambipolar conductivity will be developed and supported thin film membranes of promising materials will be fabricated and tested. Conductivity characteristics and hydrogen separation rates will be determined for selected membrane structures and candidate compositions will be employed in laboratory-scale high-pressure hydrogen separation units. Information gained during laboratory testing will be used to develop a prototype hydrogen separation unit and generate a strategy for scale-up.

Product Support Areas

Gasification Technologies	Combustion Technologies	Sequestration	Environmental & Water Resources	Advanced Turbine & Engines	Fuel Cells
✓	✓	✓			✓

NETL

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